U.S. EPA Region IX
U.S. Bureau of Reclamation

Proposal for the

CALFED Bay-Delta Program

Keswick Reservoir Sediments Feasibility Study Phase 1 and 2

May 2000

Attachment H

Proposal # 2001- F211 (Office Use Only)

PSP Cover Sheet (Attach to the front of each proposal)

Proposal Title: Spring Creek Arm of Keswick Reservoir Metal Sludges Feasibility Study and Design
Applicant Name: U.S. Environmental Protection Agency, U.S. Bureau of Reclamation
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Amount of funding requested: $2,418,300
Some entities charge different costs dependent on the source of the funds. If it is different for state or federal funds list below.
State cost _____ Federal cost _____

Cost share partners? X **Yes** ____ **No**
Identify partners and amount contributed by each USEPA:$185,900 USBR: $92,300

Indicate the Topic for which you are applying (check only one box).

- ☐ Natural Flow Regimes
- ☐ Nonnative Invasive Species
- ☐ Channel Dynamics/Sediment Transport
- ☐ Flood Management
- ☐ Shallow Water Tidal/ Marsh Habitat
- ☒ Contaminants
- ☐ Beyond the Riparian Corridor
- ☐ Local Watershed Stewardship
- ☐ Environmental Education
- ☐ Special Status Species Surveys and Studies
- ☐ Fishery Monitoring, Assessment and Research
- ☐ Fish Screens

What county or counties is the project located in? Shasta County

What CALFED ecozone is the project located in? See attached list and indicate number. Be as specific as possible 3.1

Indicate the type of applicant (check only one box):

- ☐ State agency
- ☐ Public/Non-profit joint venture
- ☐ Local government/district
- ☐ University
- ☐ Other: _____
- ☒ Federal agency
- ☐ Non-profit
- ☐ Tribes
- ☐ Private party

Indicate the primary species which the proposal addresses (check all that apply):

- ☐ San Joaquin and East-side Delta tributaries fall-run chinook salmon
- ☒ Winter-run chinook salmon
- ☒ Spring-run chinook salmon
- ☒ Late-fall run chinook salmon
- ☒ Fall-run chinook salmon
- ☐ Delta smelt
- ☐ Longfin smelt
- ☐ Splittail
- ☒ Steelhead trout
- ☐ Green sturgeon
- ☐ Striped bass
- ☐ White Sturgeon
- ☒ All chinook species
- ☐ Waterfowl and Shorebirds
- ☒ All anadromous salmonids
- ☐ Migratory birds
- ☐ American shad
- ☐ Other listed T/E species: _____

Indicate the type of project (check only one box):

- ☐ Research/Monitoring
- ☐ Watershed Planning
- ☐ Pilot/Demo Project
- ☐ Education
- ☒ Full-scale Implementation

Is this a next-phase of an ongoing project? Yes ___ No_X_
Have you received funding from CALFED before? Yes ___ No_X_

If yes, list project title and CALFED number_____

Have you received funding from CVPIA before? Yes ___ No_X_

If yes, list CVPIA program providing funding, project title and CVPIA number (if applicable):

By signing below, the applicant declares the following:

- The truthfulness of all representations in their proposal;
- The individual signing the form is entitled to submit the application on behalf of the applicant (if the applicant is an entity or organization); and
- The person submitting the application has read and understood the conflict of interest and confidentiality discussion in the PSP (Section 2.4) and waives any and all rights to privacy and confidentiality of the proposal on behalf of the applicant, to the extent as provided in the Section.

Keith A. Takata, Director
Printed name of applicant

Signature of applicant

Executive Summary

Title of Project and Amount Requested

Title: Spring Creek Arm of Keswick Reservoir Metal Sludge Feasibility Study and Design
Amount Requested: $2,418,300

Applicant

U.S. Environmental Protection Agency; 75 Hawthorne Street. San Francisco, CA. 94105-3901
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Participants and Collaborators

U.S. Bureau of Reclamation (Joint Proposal); California Environmental Protection Agency – Department of Toxic Substances Control; California Regional Water Quality Control Board.

Project Description

The sludges in the Spring Creek arm of Keswick Reservoir (SCAKR) (Figure 1) are highly toxic and mobile. These sludges pose a threat to downstream receptors, including threatened and endangered species, and restrict beneficial uses of valuable water resources. The objective of this project is to reduce or eliminate the risk posed by these sludges (also referred to as toxic sediments). The SCAKR sludges are located in the upper reaches of the Sacramento River Ecological Management Zone within the Keswick Dam to Red Bluff Diversion Dam Ecological Management Unit. The project addresses the "contaminants" topic. EPA will determine the most effective risk-reduction strategy to remediate the sludges (such as removal, isolation, prevention of new sludge deposit or other method), and then design the selected remedial alternative. This project assumes favorable resolution of the current settlement negotiations.

The project approach is to study, select, and design a remedy to address the metal-laden sludges in a manner that conforms with the requirements of the National Contingency Plan (NCP), EPA's primary set of requirements for responding to releases of hazardous substances. The agencies will seek public comment and select a remedial alternative in a Record of Decision (ROD). Once an alternative is formally selected, a design to implement the selected alternative would be developed.

The project will test the hypotheses that remediating the sludges and preventing redeposition will reduce (1) the toxicity of the IMM heavy metal discharges in the Upper Sacramento River ecosystem, (2) the need to rely on valuable California water resources to dilute IMM pollution and to flush contaminants from the SCAKR, and (3) the overall IMM metal discharge loading. The project is expected to provide an ancillary benefit of increasing CVP operational flexibility to address temperature control for anadromous fishery restoration and Trinity River instream flow needs.

The proponents believe that the project will achieve the objectives outlined above. The project directly addresses the CALFED implementation objective, ecological restoration Target 1, and Programmatic Actions 1A and 1B identified in CALFED's February 1999 ERPP, Volume 2, page 192. The actions relate to remediating heavy metal contamination from IMM and reducing or eliminating releases of the metal-laden sludges. The action will benefit all anadromous fish species, splittail, and sturgeon in the Sacramento River by reducing or eliminating contaminant stressors.

Project Description

The Iron Mountain Mine (IMM) Superfund Site is an inactive mine located in Shasta County, California. Historically, the mine has discharged massive volumes of highly acidic, heavy metal-laden acid mine drainage (AMD) into the Sacramento River at a point just upstream of one of the most important spawning areas in California. EPA listed IMM on the National Priorities List in 1983, at the request of the State of California, and has since addressed the most significant sources of AMD in four Records of Decision (RODs). Once the ROD 4 remedy is completed in 2001 or 2002, the actions taken pursuant to the EPA Superfund program will have reduced historic IMM contaminant discharges by approximately 95%.

EPA has investigated heavy metal-laden sludges that have been deposited in the Spring Creek Arm of Keswick Reservoir (SCAKR) and has initiated studies for controlling the remaining IMM metal releases that originate primarily from widespread area sources in the Boulder Creek watershed.

Statement of Problem

"Toxins from mine drainage on Spring Creek enter the (Sacramento) river by way of Keswick Dam and threaten survival of salmon and steelhead when sufficient dilution flows are not available from Shasta Lake" (CALFED ERPP, Vol. 2, February 1999, p. 165). Releases of AMD from the Spring Creek Debris Dam (SCDD) are "metered out into the releases of clean water from Shasta and Whiskeytown Reservoirs to achieve the best water quality possible....However, because of the extremely large waste load, it has not always been possible to consistently attain the water quality objectives for copper, cadmium, and zinc in the basin plan." These discharges have created metal-laden sludge deposits in the Spring Creek Arm of Keswick Reservoir. EPA's remedial action objectives for the IMM Superfund cleanup program have targeted the reduction of these extremely large heavy metal discharges.

Problem

Release of Iron Mountain AMD through the SCDD into the SCAKR results in the precipitation of metals in this area of Keswick Reservoir. Over time, massive deposits of heavy metal-laden sludges have built up in the SCAKR. The USGS (Bruns et al., 1998) estimated that approximately 250,000 cubic yards of the metal-laden sludges now occupy the SCAKR. The California Department of Fish and Game (CDFG, Fujimura et al., 1995) characterized the chemical and toxicological traits of the SCAKR sludges and found that metal concentrations in the sludges are extremely high, the sludges are toxic to aquatic life in place, waters that wash these sludges become highly toxic to aquatic invertebrates and anadromous fish species, and the potential for release of these sludges threatens the Sacramento River ecosystem. Uncontrolled flows from the SCDD during major storm events and high flows from the Spring Creek Power Plant (SCPP) could scour and mobilize the sludges, which would enter Keswick Reservoir and carry this mass of metals into the mainstem of the Sacramento River.

The potential for scouring the sludge piles in the SCAKR also restricts minimum water elevations in Keswick Reservoir and thus hampers efforts to appropriately manage operations of CVP facilities for optimal temperature control and other environmental concerns, such as Trinity River instream flow requirements. IMM discharges through SCDD require a minimum release of 200 cfs through the SCPP at all times to assure that IMM contaminants do not concentrate in the SCAKR and subsequently discharge in a harmful manner into the Sacramento River. Removing this constraint by

remediating the underlying problems could potentially make this 200-cfs water supply available for other beneficial uses.

Implementation of this project will remove or isolate the SCAKR sludges and reduce or eliminate the risk of a catastrophic release of metals into the Sacramento River. The project will also prevent the redeposition of new metals-laden sludges by taking appropriate additional actions at IMM. Remediating the SCAKR sludges promotes the following important objectives:

1. Human health and the Sacramento River ecosystem are protected from releases of heavy metals originating from IMM and the SCAKR by preventing the mobilization and redeposition of the sludges into important fishery spawning habitats, and meeting protective water quality standards established to prevent toxicity in the Sacramento River ecosystem.
2. The need to rely on valuable California water resources to dilute IMM pollution or flush contaminants from the SCAKR is reduced.
3. The metal loads discharged from the SCAKR to the Sacramento River and Bay-Delta are reduced.

Although the matter is currently in litigation, settlement negotiations are ongoing that are expected to lead to resolution of the litigation in the near-term. The request by EPA and USBR for project funding from CALFED is conditioned upon reaching a settlement, and upon that settlement not containing enough funding to address the SCAKR sludges.

Conceptual Model

The overall conceptual model depicting the source of the sludge in the SCAKR is depicted in Figure 2. The underground and open pit mining at Iron Mountain have exposed large surface areas of sulfide minerals to the oxidation process, resulting in the release of massive volumes of metal-laden AMD into Boulder Creek and Slickrock Creek which flow into Spring Creek, the Spring Creek Reservoir (SCR), and the Spring Creek Arm of Keswick Reservoir. As the acidic, metals-laden water from the SCR comes in contact with the waters released from the SCPP or Shasta Lake, which have a much higher pH, the IMM heavy metals begin to precipitate, forming the metals-contaminated sludges in the SCAKR. Approximately 250,000 cubic yards of metals-laden sludges have been deposited in the SCAKR since construction of the SCDD in 1963 (CH2M HILL, 2000a).

The sludge and the pore water contained in the sludge are very high in metals content, are toxic to aquatic organisms in relatively low concentrations (CDFG, Fujimura et al., 1995), and are toxic to plants and animals that live in or adjacent to the upper Sacramento River (CH2M HILL, 1998a, 1998b). Under current conditions, the toxic sludges pose a threat to aquatic life and the ecosystem within Keswick Reservoir and the downstream ecosystem. The metal particles that make up the sludge are extremely fine-grained, so they are easily mobilized. Pore water within and directly above the sludges is extremely contaminated.

The USBR currently restricts the manner that it operates the CVP facilities to reduce these risks to some degree, and these restrictions reduce the beneficial uses of valuable CVP water and otherwise restrict operational flexibility of CVP resources. Despite the actions currently taken by USBR, the toxicity and mobility of the sludges continue to pose a risk to downstream receptors. These risks are most severe when there are (a) high volume flows from the SCDD or the SCPP, or (b) there is a decrease in Keswick Reservoir elevation. In those conditions, large volumes of toxic sludges can be mobilized. (CH2M HILL, 2000a).

Once the sludges below the SCDD in the SCAKR are either isolated or removed as a result of the proposed project, the potential for catastrophic releases of metals into the Sacramento River from the SCAKR sediments will be greatly reduced or eliminated, lessening the threat from ongoing releases. The removal or isolation of the toxic sludge will also reduce the risk that flows from Shasta Lake, the SCPP, and the SCDD will scour and mobilize the toxic sediments into the Sacramento River below Keswick Dam. Control of the sludges will also reduce the need to rely on clean water to dilute IMM releases and prevent the mobilization of sludges through restricting operation of CVP facilities.

Remedial actions undertaken since 1994 have reduced the metal load discharged from IMM to Spring Creek and the Sacramento River by approximately 80 to 90 percent. Completion of the Slickrock Creek Dam, expected by 2001 or 2002, will further reduce the heavy metal load to an overall 95 percent reduction from the pre-1994 amounts, allowing higher volume flow to be safely discharged from the SCDD through the SCAKR and significantly reducing the potential for further sediment deposition.

Hypotheses Being Tested

The hypotheses to be tested through project implementation are as follows:

1. Isolating sludges or removing them from the SCAKR will reduce releases of heavy metals into the Sacramento River, thereby reducing toxicity and the potential for catastrophic releases of metals.
2. Isolating or removing the sludges will reduce the need to rely on CVP clean water flows to dilute the IMM pollution discharges or to flush contaminants from the SCAKR. These improvements will improve water management flexibility in CVP and SCPP operations and enable optimal management of the water supply system, temperature control, and other environmental concerns, such as Trinity River instream flow requirements.
3. The project will reduce metals loading in the Sacramento River Basin, thereby reducing or eliminating stressors that affect downstream receptors.
4. Release of contaminants during removal or other remedial action will be minimal and will not result in negative downstream effects.
5. The remedial action(s) that result from the project, along with actions currently being undertaken at IMM by EPA, will reduce the potential for metals-laden sediments to redeposit in the SCAKR.

The data required to evaluate these hypotheses and the data collection and evaluation approaches are provided in Table 1 in the section on Monitoring and Assessment Plans. The project will be tested through pre- and post-project water and sediment sampling and analysis. This monitoring, conducted under a variety of flow scenarios and seasonal and annual weather fluctuations, will enable a quantitative evaluation of the success of the project in meeting its stated objectives. EPA, USBR, and others have routinely monitored water quality in the upper Sacramento River in relation to releases from the SCDD. EPA and the USBR will to continue to perform similar monitoring programs in the foreseeable future.

As noted elsewhere in this proposal, one CALFED objective is to reduce or eliminate metals contamination from IMM, and both CALFED and the CVPIA aim to restore anadromous salmonid populations in the Sacramento River basin. These populations are threatened by metals contamination. In addition to the water quality sampling and analysis programs mentioned above, the CDFG annually conducts aerial redd surveys and carcass counts, and the USFWS annually conducts radio telemetry and video monitoring in the reach of the upper Sacramento River below Keswick Dam.

These data can provide comparative pre- and post-project information on salmonid survival, abundance, condition, and seasonal spatial and diel distribution patterns. This information may help to characterize the extent to which the anticipated reductions in metals concentrations are having a beneficial effect on fisheries restoration.

Adaptive Management

Monitoring of water quality before, during, and after the project will help to verify that project objectives of reducing metal discharges and sludge deposition are being met. Adaptive management will also be utilized if a sludge removal action is selected that requires several construction seasons. Sludge removal would likely require more than two construction seasons due to a limited construction season and other factors. Water quality and other data collected during performance of the project will provide information to assess the success of the action and make appropriate modification to meeting the project's objectives and CALFED ERP objectives.

Educational Objectives

The educational objective of the project is to inform the public and interested state and federal agencies about the contaminated sludges in SCAKR and the appropriate response actions associated with those sludges. The process of developing a preferred alternative will involve the public through public notice, public comment, public meetings, and comment reviews. During this public involvement, review, and comment process, the purposes, goals, and objectives of the project will be communicated to the public. The project will communicate to the public the CALFED ERP goals of reducing metals concentrations entering the Sacramento River from IMM and reducing or eliminating the potential for catastrophic releases of dissolved metals from the sludge piles into the Sacramento River. The public will also have the opportunity to evaluate the risks associated with the proposed project.

In addition to the general public, the project will involve representatives of State and local government, and reach out to public interest groups concerned about the fisheries and other conservation issues regarding the Sacramento River basin.

Proposed Scope of Work

Location and/or Geographic Boundaries

The project is located in Shasta County in the upper reaches of the Sacramento River Ecological Management Zone within the Keswick Dam to Red Bluff Diversion Dam Ecological Management Unit. More specifically, the project is in the Spring Creek Arm of Keswick Reservoir (SCAKR) (Figure 1). The UTM coordinates for the project's center point are 546,000 E; 4,498,0000 N. The latitude and longitude of the project are 40°38' N and 122°27'30" W, respectively, using 1927 North American datum. Plate 1, a true-scale aerial photo, shows the metal-laden sludge piles beneath the water surface in the Spring Creek Arm of Keswick Reservoir.

Approach

The project approach is to build upon the work previously completed by the California Department of Fish and Game, the U.S. Geological Survey, and the U.S. EPA. Under existing funding, EPA will complete a remedial investigation report. That report will detail the results of a subsurface investigation conducted at the site, provide results and analysis of analytical testing conducted on sludge and porewater, provide the results of toxicology testing conducted using pore water obtained during the EPA subsurface investigation, and provide the results of treatablity testing (CH2M HILL, 2000b) conducted on the sludges.

The proposed project will rely on this compilation of scientific information contained in EPA's final IMM sludges RI to conduct the following activities for the proposed project: (1) perform a Feasibility Study (FS), (2) develop a Proposed Plan, (3) seek public and agency comment and review of the Proposed Plan, (4) select a remedial alternative in Record of Decision (ROD), and (5) produce a design for implementation of the selected remedial alternative.

Feasibility Study: The approach of the feasibility study is to develop and evaluate remedial alternatives, consistent with NCP requirements, to isolate in place or remove all or part of the approximately 250,000 cubic yards of heavy metal-laden sludges that have accumulated in the SCAKR as a result of the historic discharges of AMD from IMM, as well as steps necessary to prevent the redeposition of sludges once the current sludges are controlled. The FS will evaluate the implementability, effectiveness, and cost-effectiveness of the remedial alternatives in meeting project goals and objectives, including protectiveness and compliance with all Applicable or Relevant and Appropriate Requirements (ARARs). At a minimum, the following alternative concepts would be included in the evaluation:

1. The "No Action" alternative, required by the NCP, entails a continuation of ongoing current activities and operations related to the project, but taking no further action to address the threats posed by the heavy metal-laden sludges in the SCAKR. The FS evaluation of current activities and operations would address the implementability, effectiveness, and cost-effectiveness of taking no further actions with respect to the SCAKR sludges, but continuing current operations related to the EPA IMM Superfund cleanup actions. The FS evaluation would also assess the continuation of current USBR operational practices and activities with respect to CVP facilities.

2. The "Sludge Isolation by Capping" alternative would involve capping the sludges in-place. The analysis would require evaluation of the mechanics of capping, including geotechnical concerns related to internal and external stability, evaluation of seasonal construction activities that would coincide with periods of low flow from the SCPP and SCDD to avoid potential impacts on sensitive life stages of salmonid populations, construction and O&M costs, loss of power generating revenue if the SCPP flows were interrupted, implementability, effectiveness of cap for reducing sludge transport, and the extent to which capping would eliminate leaching of metals from the piles.

3. The "Sludge Isolation by Damming" alternative would include constructing a dam across the mouth of the SCAKR to physically isolate the toxic sludges from Keswick Reservoir CVP operations. The FS would evaluate approaches for removal of a portion of the sludge at the dam site to provide for an adequate dam foundation. The FS would evaluate technology options to convey discharges from the SCPP and SCDD around the contained sludges to Keswick Reservoir. Potential disposal locations for the dredged sludge would be evaluated.

4. The "Removal of the Sludge" alternative would include: (1) removing the sludges from SCAKR by dredging or other means, (2) dewatering the solids, (3) disposing of the solids in a landfill, and (4) disposing of the water, with or without treatment. Technology options for containment of the fine-grained sludges during removal to prevent downstream water quality impacts will be considered. Sludge dewatering technologies may require large land areas. There are a limited number of sites for solids disposal in the area of the SCAKR. Discharge of the water drained from the sludges into the SCR may require additional treatment.

An important consideration for the evaluation of alternatives is the extent to which the alternatives would achieve project objectives. These include promoting long-term compliance with the California Basin Plan objectives for metals loading, reducing the potential for further sludge deposition,

meeting CALFED objectives for reduction of metals loading in the Sacramento River and Bay Delta, and reducing the threat of catastrophic releases of metals associated with scouring and mobilizing the sludges during high flow episodes and reservoir drawdown operations.

Meetings will be held with interested agency representatives and local public entities during the Feasibility Study to solicit technical data and information that will be incorporated in the criteria analysis for each alternative. An Agency review draft of the Feasibility Study would be produced for agency review and comment prior to production of a Pubic Comment Feasibility Study and a Proposed Plan. Agency and public participation in selection of a remedy will be accomplished through conformance with CERCLA requirements. Once a remedial alternative is selected in a formal Record of Decision, the selected alternative will be designed in accordance with procedures outlined in the NCP.

Remedial Design: The design effort would entail the development of design criteria to ensure that the project, once constructed, would meet the performance standards and criteria selected in the ROD. (Note that if "no action" is selected, no design will be required). The designer would conduct engineering testing and analyses that would be used in the design process. This testing would include bathymetric surveying and subbottom profiling using side scan and multi beam sonar to obtain an accurate definition of the position, quantity, and extent of sludges within the reservoir arm. The testing would include pilot plant testing to determine the geotechnical design requirements for isolation of the sludges or the process requirements for excavation and sludge dewatering.

The design will include a preliminary or conceptual-level design for review by involved and interested State and federal agency representatives. Once the preliminary design is approved, the designer would prepare an informal, intermediate-level design for agency discussion at a design review meeting. The designer would then proceed with preparation of pre-final detailed design drawings and specifications and a construction cost estimate, supported by all required engineering analysis reports and engineering calculations for agency review and approval. Following receipt of review comments, the design would be finalized.

Monitoring and Assessment Plans

Water quality sampling and analysis, and surface-water flow measurements have been ongoing for more than 10 years by the USBR, RWQCB, EPA, the former owners of IMM, and others. Sampling has been regularly performed at various locations downstream of Iron Mountain, downstream of the SCDD (and upstream of the SCAKR), and downstream of Keswick Dam. After this project is completed, efforts to assess water quality and measure surface-water flow rates will continue with flow measurements, sampling, and analysis to be performed primarily by the EPA and the USBR. Evaluation of the pre- and post-project data will demonstrate the effectiveness of the project in reducing metals concentrations flowing into the Sacramento River from IMM.

Furthermore, ongoing annual pre- and post-project biological monitoring by the CDFG and USFWS is expected to provide information on the anticipated benefits of the project to aquatic species, particularly in terms of survival, abundance, condition, and seasonal spatial and diel distribution patterns of anadromous salmonids. The CDFG annually conducts aerial redd surveys and carcass counts, and the USFWS annually conducts radio telemetry and video monitoring in the reach of the Sacramento River below Keswick Dam. Table 1 summarizes the proposed monitoring and data collection program.

Table 1
Monitoring and Data Collection Information

Hypothesis/Question to be Evaluated	Monitoring Parameters and Data Collection Approach	Data Evaluation Approach	Comment Data Priority
I. Biological/Ecological Objectives: Protect human health and the environment by reducing the potential for catastrophic and other releases of metal sludges into the Sacramento River and by meeting protective water quality standards.			
The project will reduce releases of metals into the Sacramento River and improve water quality.	Measure pre- and post-project sludge quantities; monitor surface water quality.	Monitor implementation of cleanup; Statistically analyze and compare surface-water monitoring data.	Evaluate and continue existing monitoring programs.
II. Biological/Ecological Objectives: Reduce the need to rely on valuable water resources to dilute IMM pollution or flush contaminants from the SCAKR.			
The project will reduce the need to rely on water resources for dilution or flushing flows.	Monitor surface-water quality.	Statistically analyze and compare surface-water monitoring data.	Evaluate and continue existing monitoring programs.
III. Biological/Ecological Objectives: Reduce the metal loads discharging from the SCAKR to the Sacramento River and Bay-Delta.			
The project will reduce releases of metals from the SCAKR to the Sacramento River and Bay Delta.	Monitor surface-water quality.	Statistically analyze and compare surface-water monitoring data.	Evaluate and continue existing monitoring programs.

Data Handling and Storage

Data developed in connection with the project will be handled in a manner consistent with existing EPA data management and storage procedures. EPA, USBR, and others have collected data that are relevant to this project. This information is stored by the EPA and state and federal resource agencies that have trustee roles in matters regarding Iron Mountain. Data produced during this project will be incorporated into the appropriate databases maintained by EPA and will be published and made available to the public at public repositories. Two places where EPA information for IMM is stored are the EPA Records Center in San Francisco and the Shasta County Public Library in Redding. Because the investigations and remedial actions involving IMM are conducted under CERCLA provisions, there is an ongoing public involvement process that provides both for storage and accessibility of the data and for meaningful opportunities for public input into the decision-making process for remedial actions.

Expected Products/Outcome

The expected outcome of this project is a final design for a remediation of the SCAKR sludges that would assure the protection of the Sacramento River ecosystem. The project will generate the following products or outcomes: **Phase I:** Feasibility Study; Proposed Plan; Response to Comments; and Record of Decision (ROD); and **Phase II:** Design Criteria Report; Preliminary Remedial Design (RD); Intermediate Remedial Design; Pre-final Remedial Design Drawings and Specifications; and Final Remedial Design Drawings and Specifications. (**Phase III**: Construction of the Remedial Action, is not included in this proposal.)

Work Schedule

Phase I: Task 1: Project Management (April 2001-March 2003); Task 2: Feasibility Study (April 2001 to September 2001); Task 3: Proposed Plan (September 2001 to January 2002); and Task 4: ROD (January 2002 to April 2002). **Phase II:** Task 5: Remedial Design (April 2002 to March 2003). **Phase III** (Construction funding from CALFED will be requested in future funding cycles). The proposed schedule is shown in Figure 3.

Funding of both Phases I and II at this time would enable the project to remain on schedule through the end of Phase II and to begin construction (Phase III) in 2002, assuming that funding to initiate construction is available at that time. If Phase II is not funded during this funding cycle, there will be at least a 1-year delay in commencement of construction, during which time metals discharges will continue to occur, the potential remains for catastrophic releases of metals, and SCPP and CVP operations are constrained. If only partial funding is available, full funding of Phase I would enable progress in resolving the IMM problem through signing of the ROD.

Feasibility

Currently available information (e.g., CH2M HILL, 2000a) demonstrates that it would be feasible and highly beneficial to remove the sludges from the SCAKR for treatment and safe storage and management. Engineering analysis indicates that it might also be possible to isolate the sludges in place. As part of this project, the agencies would study in more detail the feasibility and effectiveness of the identified alternatives.

More specific to the project proposed herein, the EPA is in the final stages of a Remedial Investigation (CH2M HILL, 2000a) to characterize the nature and extent of the heavy metal-laden sludges located in the SCAKR. It is a compendium of more than 3 years of scientific work, including toxicity analyses, physical and geochemical characterization, sampling and analysis activities, fate and transport studies, hydrological studies, and other related work. This results of this effort demonstrate that the problem under consideration is well defined and that the intended deliverables (feasibility study, proposed plan, public and agency involvement, ROD, and remedial design) are well within the capability of the project team. The schedule is reasonable and fits very well with the overall schedule for implementation of ROD 4 at the Iron Mountain Mine site. The remedial design (if selected) is scheduled for completion soon after the EPA completion of the ROD 4 Slickrock Creek Retention Reservoir project. The ROD 4 project is estimated to further reduce IMM site discharges, achieving a total 95-percent reduction in IMM site contaminant discharges.

Environmental compliance and permitting would be addressed through ARARs. While CERCLA exempts a lead agency for a remedial action from the administrative permitting requirements, the lead agency is required to assure compliance with the substantive requirements of all ARARs. This CERCLA exemption is intended to streamline the cleanup process, while maintaining the appropriate controls represented by the permitting and environmental compliance processes.

Applicability to CALFED ERP GOALS and CVPIA

ERP Goals and CVPIA Priorities

The project directly addresses the CALFED implementation objective, ecological restoration Target 1, and Programmatic Actions 1A and 1B identified in CALFED's February 1999 ERPP, Volume 2, page 192. The actions relate to remediating heavy metal contamination from IMM and eliminating scouring of the metal-laden sludges. The action will benefit all anadromous salmonid fish species, splittail, and sturgeon, all of which occur in the upper mainstem of the Sacramento River, by reducing or eliminating contaminant stressors and the threat of catastrophic releases of dissolved metals. Existing endangered species recovery plans, including the USFWS (1996) Recovery Plan for the Sacramento/San Joaquin Delta Native Fishes and the NMFS (1997) Proposed Recovery Plan for the Sacramento River Winter-run Chinook Salmon, the CALFED ERPP (February 1997, Volume II, page 181) form the basis for the ERP targets and programmatic actions.

The ERP states: Completion of studies and subsequent implementation of the U.S. Environmental Protection Agency (EPA) remedies for the IMM Superfund site are needed to attain the safe metal concentrations identified in the basin plan. Pollution control remedies are required at the IMM portal for discharges of remaining sulfide ore deposits inside the mountain, the discharges from tailing piles, and **the metal sludge in Keswick Reservoir** (emphasis added).

The CVPIA, which is being implemented by the USFWS and USBR, prioritizes the restoration of habitats and species and elimination of many stressors, including contaminants. A key element of the CVPIA is the Anadromous Fish Restoration Program. The proposed project would reduce metals contamination in the Sacramento River and greatly reduce or eliminate the potential for catastrophic releases of metals that could result from the scouring and mobilization of the metals-laden sludges in the SCAKR. Both the releases of dissolved metals associated with discharges from the SCDD and potential catastrophic releases of metals from the disturbance of the sludges threaten the health and recovery of anadromous fish species in the Sacramento River.

Although all life stages of the species mentioned above are represented in this reach of the Sacramento River, more than 75 percent of naturally spawning chinook salmon in the Sacramento River spawn in the Keswick Dam to Red Bluff Diversion Dam reach. Therefore, metals releases from the IMM directly threaten the most critical Sacramento River spawning areas for anadromous salmonid species.

Relationship to Other Ecosystem Restoration Projects

The resource agencies and the EPA have been seeking a solution to the problems associated with AMD from IMM for more than 17 years, since the IMM was placed on the National Priorities List. Fishkills in the Sacramento River from IMM contamination have been confirmed or suspected for more than 50 years. Other projects and programs that these efforts are linked to, including the proposed project, include the CALFED Bay-Delta Program, the USFWS (1996) Recovery Plan for the Sacramento/San Joaquin Delta Native Fishes and the NMFS (1997) Proposed Recovery Plan for the Sacramento River Winter-run Chinook Salmon, the California Salmon, Steelhead Trout and Anadromous Fisheries Program Act of 1988, and the CVPIA Anadromous Fish Restoration

Program. The proposed project provides protection for the most productive anadromous fishery spawning habitat on the Sacramento River. It is crucial to these and all other habitat and fisheries restoration projects and programs in the Sacramento River that the prime spawning and rearing habitat of the upper Sacramento River be protected from metals contamination.

Requests for Next-phase Funding

This proposal is NOT a request for next-phase funding.

Previous Recipients of CALFED or CVPIA Funding

This project has NOT previously received funding from CALFED or CVPIA.

System-wide Ecosystem Benefits

This project, which seeks to reduce the amount of dissolved metals presently entering the river and to greatly reduce or eliminate the threat of catastrophic releases of metals associated with the sludges in SCAKR, benefits virtually **ALL** CALFED and CVPIA projects and programs that aim to restore Sacramento River aquatic habitats, the organisms that inhabit them, and the fisheries. Bioassays show the sludges in the SCAKR are lethal to aquatic organisms, even in relatively low dilutions, and pore water from the sludges are toxic to plants and animals that live in or adjacent to the upper Sacramento River (CH2M HILL, 1998a, 1998b; Fujimura et al., 1995).

The CALFED ERPP (February 1999, Volume II, page 165) states that, "Toxins from mine drainage on Spring Creek enter the river by way of Keswick Dam and threaten survival of salmon and steelhead when sufficient dilution flows are not available from Shasta Lake." There are documented instances of metal concentrations in the upper Sacramento River that exceed toxic levels considered safe for early life stages of salmon. Fish deaths may have occurred on occasions when toxicity levels have been exceeded (CALFED ERPP, February 1999, Volume II, page 192).

Qualifications

The EPA project team has demonstrated outstanding success in controlling and reducing contaminant discharges from the IMM site by completion of comprehensive remedial investigations, feasibility studies, technically challenging designs, and implementation of numerous remedial actions. These include: (1) constructing clean water diversions in the Slickrock Creek and Spring Creek watersheds; (2) capping an open pit mine and subsidence areas; (3) excavating, consolidating, and capping pyritic tailings; (4) rehabilitating mine workings, and (5) constructing and operating a 2,500-gpm high density sludge (HDS) treatment plant. EPA is currently designing the Slickrock Creek Retention Reservoir and expanding the Minnesota Flats HDS treatment plant to collect and treat an additional 4,000 gpm of contaminated discharges from the Slickrock Creek basin. These actions represent more than $150 million in scientific and engineering studies, designs, and remedial actions that are estimated to reduce the contaminant discharges from the Iron Mountain Mine site by 95 percent.

CH2M HILL, one of the largest U.S. firms providing comprehensive engineering, scientific, economic, and planning expertise for large-scale, hazardous materials investigation and remediation projects, will provide consultant services to the EPA. CH2M HILL has served the regulated community for more than 50 years and has designed and constructed large-scale remedial actions for local, state, and federal agencies and industrial clients nationwide.

Staff Organization and Key Project Personnel

As shown on the organization chart (Figure 4), EPA Project Manager, Rick Sugarek, will administer the project in cooperation with the U.S. Bureau of Reclamation Project Coordinator Laura Allen. The project team will include a Science Technical Advisory Committee, lead by the U.S. Geologic Survey. CH2M HILL will provide engineering, planning, scientific, and economic expertise.

Rick Sugarek, U.S. EPA Project Manager and Project Administrator
Rick Sugarek is the Iron Mountain Mine Remedial Project Manager. He is responsible for work planning, coordinating, and assuring the technical progress and correctness of actions at the Site, interpretations of regulatory requirements, and scheduling. He is responsible for all aspects of the project including oversight of project contracts and Interagency Agreements, oversight of design and construction efforts, performance of technically complex site investigations, coordination and negotiations with state and federal agencies, community relations, and technical negotiations with private parties.

Laura Allen, U.S. Bureau of Reclamation Project Coordinator
Deputy Regional Environmental Officer and Regional Hazardous Materials Coordinator
Laura Allen has administrative oversight responsibilities for the U.S. Bureau of Reclamation Environmental Affairs Division and is the Regional Hazardous Materials coordinator. She is responsible for providing technical assistance and program guidance for regional NEPA and ESA activities, water quality, Interagency Ecological Program coordination, and cultural resources and hazardous materials compliance. She will lead the Central Valley Operations Office project team, which includes Martin Bauer, Paul Srogus, and Tomas Dong, in coordination of Reclamation operations with this project.

Charlie Alpers, U.S. Geological Survey, Research Chemist
B.A. Geological Sciences, Ph.D. Geochemistry
Dr. Alpers has been the project chief for numerous water-quality investigations of trace-element geochemistry in areas affected by historic mining, acid mine drainage at the Iron Mountain Superfund site, the characterization of metal-contaminated sludges in Keswick Reservoir, and transport of trace metals in the Sacramento River.

Darrell Kirk Nordstrom, U.S. Geological Survey, Hydrologist
Ph.D. Geology
Since joining the USGS in 1981, Dr. Nordstrom has published numerous journal articles on acid mine drainage, nuclear waste disposal, and geochemical modeling. He is co-author of a widely used textbook on Geochemical Thermodynamics. Dr. Nordstrom is one of the world's leading authorities on acid mine drainage and trace metals in the environment.

John Spitzley, Ph.D., P.E., Consultant Team Project Manager
Ph.D., M.S., Civil Engineering; Professional Engineer: Utah, California
Dr. Spitzley is CH2M Hill's Site Manager for the Iron Mountain project. He is responsible for RD/RA oversight, enforcement support, technical support, and RI/FS. He has had 15 years' experience in the design and construction of water treatment plants and large earthwork projects including the IMM HDS treatment plant and other projects designed and constructed at Iron Mountain.

Dave Bunte, Technical Lead
M.S., Metallurgy, B.A., Earth Science
Dave Bunte's 14 years of environmental engineering experience has focused on remediation of mining sites. He has helped formulate a range of remedial methods, including treatment of acid mine drainage and prevention of formation of acid mine drainage. He has evaluated treatment requirements and sludge disposal options under various remediation strategies and provided technical assistance to evaluate the chemistry of various options and cost estimates for treatment approaches.

Bill Bluck, P.E., Senior Engineer
B.S., Metallurgical Engineering; Professional Mining Engineering: Utah, North Carolina
Bill Bluck has more than 35 years of experience involving project management, engineering design, construction management, and process development engineering for both private sector and governmental clients. This includes more than 25 years of environmental engineering experience, primarily for the mining industry, in permitting, environmental audits, EIS preparation, feasibility studies, and engineering design and construction, as well as more than 15 years of direct experience in the hazardous waste sector.

Jim Mavis, Process Chemist.
B.S., Chemistry
Jim Mavis is a senior process chemist for CH2M HILL with 30 years experience in process design, industrial wastewater systems design, remediation of mining wastes, technical evaluation of industrial and hazardous waste streams, and process chemistry assessment. Typical projects include unit operation selection, systems development, equipment selection and sizing, treatability and pilot plant configuration and testing, equipment scale-up, and process chemistry issues involving arsenic, transition metals, selenium, mercury, boron, and indium. He has served as a senior consultant on the IMM project.

COST

Budget

The proposed Scope of Work for the tasks included in this application for Phase 1 includes the preparation of a Feasibility Study (FS), a Proposed Plan, and a Record of Decision (ROD). Phase 2 includes the Remedial Design for the alternative selected in Phase 1. If the "No Action" alternative is selected, Phase 1 costs will not be required.

Task 1. Project Management will include developing project instructions, work plans, schedule, staff resource plan, budgets, monitoring of the schedule, invoicing work completed, and preparing ongoing communications with participating agencies. These efforts will require approximately equal levels of effort. For this proposal, Project Management extends into the first quarter of 2003. This reflects the need to coordinate decisions from the environmental and permitting processes. The total Project Management costs equal $100,200 for EPA, USBR and CH2M HILL participation.

Task 2. The Feasibility Study will follow the CERCLA FS process and will include the development and screening of a range of alternatives. Preliminary costs will be developed for the alternatives. The alternatives will then be evaluated based on seven criteria specified by CERCLA guidance. The FS document will be the deliverable from this task. The total costs for the Feasibility Study equals $364,800 including costs for EPA, USBR and CH2M HILL.

Task 3. After the completion of the FS, a Proposed Plan will be prepared. The Proposed Plan summarizes the findings of the FS and identifies the preferred alternative. The Proposed Plan is a relatively short "fact sheet" that is distributed to interested parties. The FS is also available for public review. The FS is usually not widely distributed to individuals but is made available for review at the designated information repositories. After the Proposed Plan is released a public meeting will be held to provide the opportunity for public input. A public comment period of 30 to 60 days will take place after the Proposed Plan is released. The total cost for the Proposed Plan equals $76,500 for EPA, USBR and CH2M HILL.

Task 4. The ROD will define the selected remedy for the site and the regulatory requirements that control the remedial action. It will also include the responsiveness summary that presents the comments received during the public comment period. The total cost for the Responsiveness Document and the Record of Decision equals $134,431 for EPA, USBR and CH2M HILL.

Task 5. A pilot study will be conducted to obtain design data for the selected solids dewatering process. The pilot study will be used to confirm sizing design of ponds and/or mechanical dewatering equipment. Separation of solids and liquids is a critical issue in dredge system design. The pilot plant study is essential to observing the potential for increased turbidity in the Keswick River and the Sacramento River during excavation or handling of the sludges. The total cost for the Pilot Plant Study equals $248,320.

Task 6. This task would include bathymetric surveying and subbottom profiling using side scan and multi beam sonar to obtain an accurate definition of the position, quantity, and extent of sludges within the reservoir arm. This information will be required to provide a more precise estimate of sludge quantities and locations, and provide required information for a construction contractor. The total cost for the bathymetric surveying and subbottom profiling equals $153,873.

Task 7. The design criteria and engineering analyses reports will be developed in Task 7. These will include analysis of the pilot plant study, the bathymetric surveying and subbottom profiling, hydraulic analysis of reservoir currents, and design criteria and performance criteria for sizing equipment, pipes, pumps, structures, roads, holding ponds and tanks and all other facilities. The engineering analyses will include mapping the site and establishing precise survey control in the reservoir and selected sludge repository locations. The analyses will include an analysis of geotechnical and hydrogeologic parameters for evaluation of the sludge repository locations and the method for sludge handling. The total cost for the design criteria and engineering analyses reports equals $343,514.

Task 8. The design will include a preliminary or conceptual-level design for review by involved and interested state and federal agency representatives. The estimated cost for the preliminary design equals $371,141.

Task 9. Once the preliminary design is approved, the designer would prepare an informal, intermediate-level design for agency discussion at a design review meeting. The estimated cost for the intermediate-level design equals $76,306.

Task 10. After completion of the intermediate design, the designer would then proceed with preparation of pre-final detailed design drawings and specifications and a construction cost estimate, supported by all required engineering analysis reports and engineering calculations for agency review and approval. The estimated cost for the pre-final-level design equals $259,459.

Task 11. Following receipt of review comments, the designer would then proceed with preparation of final detailed design drawings and specifications and a final construction cost estimate, supported by all required final engineering analysis reports and engineering calculations. The estimated cost for the final design equals $137,494.

A detailed budget is presented in Table 2. This table presents a breakdown of the project costs by year. The total costs for the project equals $2,695,500. Table 3 presents a summary of the requested budget for Phases 1 and 2 of the project. The total cost requested from CALFED equals $2,418,300. Budget for Phase 3 (Construction) is not included in this current grant application.

Cost-sharing

The costs for EPA and a portion of the costs from Reclamation are not requested from CALFED and will be borne directly by these agencies. The USBR as the cooperating agency will coordinate with EPA on project activities and provide technical support for the feasibility study and design tasks.

Cost Sharing. EPA and USBR have committed to provide funding for their efforts on this project. It is estimated that these costs will total $ 277,200.

Table 2

Total Project Costs

Spring Creek Arm of Keswick Reservoir Metal Sludge Feasibility Study and Design

Year	Task	Direct Labor Hours	Subject to Overhead						Exempt from Overhead		Total Cost
			Salary	Benefits (35%)	Travel	Supplies & Expendables	Service Contracts	Over-- head (90%)	Equip- ment	Graduate Student Fee Remission	
Year 1	Project Management	500	20,500	7,175	1640		52,400	18,450			100,200
	Feasibility Study	249	10,200	3,570	820		341,000	9,180			364,800
	Proposed Plan	249	10,200	3,570	820		52,700	9,180			76,500
	Record of Decision	249	10,200	3,570	820		32,600	9,180			56,400
	Total Cost Year 1	1,246	51,100	17,885	4100		478,700	45,990			597,800
Year 2	Project Management	659	27,000	9,450	1640		69,900	24,300			132,300
	Record of Decision	395	16,200	5,670	1140		97,800	14,580			135,400
	Pilot Plant Testing	132	5,400	1,890	820		248,300	4,860			261,300
	Bathy Survey & Sonar	132	5,400	1,890	820		153,900	4,860			166,900
	Design Criteria and EA	527	21,600	7,560	820		343,500	19,440			392,900
	Preliminary Design	263	10,800	3,780	0		371,100	9,720			395,400
	Intermediate Design	263	10,800	3,780	820		76,300	9,720			101,400
	Prefinal Design	263	10,800	3,780	0		173,000	9,720			197,300
	Total Cost Year 2	2,634	108,000	37,800	6,060		1,533,800	97,200			1,782,900
Year 3	Project Management	454	18,600	6,510	820		17,500	16,740			60,200
	Prefinal Design	263	10,800	3,780	820		86,500	9,720			111,600
	Final Design	51	2,100	735	820		137,500	1,890			143,000
	Total Cost Year 3	768	31,500	11,025	2,460		241,500	28,350			314,800
Total Project Cost		4,649	190,600	66,710	12,620		2,254,000	171,540			2,695,500

Table 3

Project Costs Requested From CALFED

Spring Creek Arm of Keswick Reservoir Metal Sludge Feasibility Study and Design

			Subject to Overhead						Exempt from Overhead		
Year	Task	Direct Labor Hours	Salary	Benefits (35%)	Travel	Supplies & Expendables	Service Contracts	Over-head (90%)	Equip-ment	Graduate Student Fee Remission	Total Cost
Year 1	Project Management	159	6,500	2,275	820		52,400	5,850			67,800
	Feasibility Study	78	3,200	1,120	410		341,000	2,880			348,600
	Proposed Plan	78	3,200	1,120	410		52,700	2,880			60,300
	Record of Decision	78	3,200	1,120	410		32,600	2,880			40,200
	Total Cost Year 1	393	16,100	5,635	2050		478,700	14,490			517,000
Year 2	Project Management	322	13,200	4,620	820		69,900	11,880			100,400
	Record of Decision	193	7,900	2,765	570		97,800	7,110			116,100
	Pilot Plant Testing	63	2,600	910	410		248,300	2,340			254,600
	Bathy Survey & Sonar	63	2,600	910	410		153,900	2,340			160,200
	Design Criteria and EA	259	10,600	3,710	410		343,500	9,540			367,800
	Preliminary Design	129	5,300	1,855	0		371,100	4,770			383,000
	Intermediate Design	129	5,300	1,855	410		76,300	4,770			88,600
	Prefinal Design	129	5,300	1,855	0		173,000	4,770			184,900
	Total Cost Year 2	1,288	52,800	18,480	3,030		1,533,800	47,520			1,655,600
Year 3	Project Management	124	5,100	1,785	410		17,500	4,590			29,400
	Prefinal Design	227	9,300	3,255	410		86,500	8,370			107,800
	Final Design	(315)	-12,900	-4,515	0		137,500	-11,610			108,500
	Total Cost Year 3	37	1,500	525	820		241,500	1,350			245,700
Total Project Cost		1,717	70,400	24,640	5,900		2,254,000	63,360			2,418,300

Local Involvement

Local Government Coordination

The Clerk of the Shasta County Board of Supervisors and the Shasta County Planning Department have received copies of this proposal. The transmittal letters to these agencies that accompanied the proposal are attached.

Local Interest Group/Affected Parties

The U.S. EPA has been working since 1983 in cooperation with other state and federal agencies to resolve the problems associated with AMD from IMM. CERCLA requires both state and public participation in decision making regarding remedial actions for listed sites. For the IMM, agencies participating on behalf of the State of California include the California Environmental Protection Agency-Department of Toxic Substances Control and the California Regional Water Quality Control Board. The California Department of Fish and Game has taken an active interest in efforts to clean up IMM discharges into the Sacramento River Basin.

Public Outreach Plan

Affected and interested parties will be notified through the local media, as well as through the public notification and involvement requirements of CERCLA. New and innovative public notification media, such as a project web page, will be considered. As described under Task 1, development of the FS, including the identification and screening of project alternatives, will include public review and comment. The project team charter will focus on building a consensus among the key interested parties, recognizing that there are a number of perspectives on how the objectives of the project can be safely and effectively accomplished. Also pursuant to CERCLA requirements, the public will have ample opportunity to provide scoping input and review and comment on the Proposed Plan, which will describe the project in detail.

Potential Third Party Impacts/Benefits

Because the project will reduce the potential impact of migration of heavy metal-laden sludges and contaminant discharges into the mainstem of the Sacramento River, all third parties interested in restoring anadromous fish species in the Sacramento River and reducing heavy-metal loading to the Bay-Delta systems will benefit.

Because the project will improve water management flexibility in CVP and Spring Creek Power Plant operations by reducing the need to rely on CVP clean water flows to dilute the IMM pollution discharges or to flush contaminants from the Spring Creek arm of Keswick Reservoir, and by reducing other CVP constraints, such as reservoir operational restrictions, all third parties interested in optimal management of the CVP water supply system, temperature control, power generation, and Trinity River instream flow requirements will benefit.

Compliance with Standard Terms and Conditions

The project will comply with all standard terms and conditions stated in Attachments D and E of the solicitation.

Literature Cited

Bruns, Terry R., Charles Alpers, and Paul Carlson. 1998. *Distribution, Thickness, and Volume of Precipitated Acid Mine Drainage Sediment in Keswick Reservoir, Northern California.* Draft report by U.S. Geological Survey. December.

CALFED. 1999. Revised Draft *Ecosystem Restoration Program Plan, Volume II: Ecological Management Zone Visions.* February.

CH2M HILL. 2000a. Draft *Iron Mountain Mine Sediment Remedial Investigation, Redding, California.* Prepared for U.S. Environmental Protection Agency. In progress.

CH2M HILL. 2000b. *Iron Mountain Mine—Sediments Treatability Study.* Technical memorandum to U.S. Environmental Protection Agency, Region IX. In progress.

CH2M HILL. 1998a. Agency Review Draft *Bioassay Report: Acute and Chronic Definitive Bioassays Conducted September 24 through November 27, 1997—Sediment Remedial Investigation, Iron Mountain Mine.* Prepared for U.S. Environmental Protection Agency. August.

CH2M HILL. 1998b. Agency Review Draft *An Evaluation of the Toxicity of Sediment Porewater from the Iron Mountain Mine Superfund Site to* Ceriodaphnia dubia—*Volume I of II, Sediment Remedial Investigation, Iron Mountain Mine.* Prepared for U.S. Environmental Protection Agency. August.

Fujimura, Robert W., Charlie Huang, and Brian Finlayson. 1995. *Chemical and Toxicological Characterization of Keswick Reservoir Sediments.* Final report by California Department of Fish and Game to State Water Resources Control Board. March.

National Marine Fisheries Service (NMFS). 1997. *Proposed Recovery Plan for the Sacramento River Winter-run Chinook Salmon.*

U.S. Bureau of Reclamation. 1991. *Erosion, Sedimentation, and Mining Pollution in the Spring Creek Basin, Volume I.* September.

U.S. Fish and Wildlife Service. 1996. *Recovery Plan for the Sacramento/San Joaquin Delta Native Fishes.* November.

Threshold Requirements

Letters of Notification

Environmental Compliance Checklist

Land Use Checklist

Contract Forms

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

May 15, 2000

Clerk of the Board
Shasta County Board of Supervisors
1815 Yuba Street, Suite 1
Redding, CA 96001

Subject: CALFED Grant Application

This letter notifies you that today EPA submitted a grant application to CALFED for the purpose of obtaining funding for conducting a feasibility study and performing a design of a selected remedial alternative to address the environmental risks posed by approximately 200,000 cubic yards of metal-laden sludges in the Spring Creek Arm of Keswick Reservoir (SCAKR).

The project will remove or isolate the SCAKR sludges and reduce or eliminate the risk of a catastrophic release of metals into the Sacramento River. The project will also prevent the redeposition of new metals-laden sludges by taking appropriate additional actions at IMM. Remediating the SCAKR sludges promotes the following important objectives:

1. Human health and the Sacramento River ecosystem are protected from releases of heavy metals originating from IMM and the SCAKR by preventing the mobilization and redeposition of the sludges into important fishery spawning habitats, and meeting protective water quality standards established to prevent toxicity in the Sacramento River ecosystem.

2. The need to rely on valuable California water resources to dilute IMM pollution or flush contaminants from the SCAKR is reduced.

3. The metal loads discharged from the SCAKR to the Sacramento River and Bay-Delta are reduced.

A copy of our proposal is attached to this letter. If you would like to discuss this proposal in further detail, please feel free to call me at (415) 744-2226

Sincerely,

Rick Sugarek
Remedial Project Manager

cc. Rodgers, USBR

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

May 15, 2000

Shasta County Planning Department
1855 Placer Street
Redding, CA 96001

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Sincerely,

Rick Sugarek
Remedial Project Manager

Environmental Compliance Checklist

1. Do any of the actions indicated in the proposal require compliance with either the California Environmental Quality Act (CEQA), the National Environmental Policy Act (NEPA), or both?

   Answer: No. The feasibility study and design efforts will be conducted in full compliance with the requirements of CERCLA and the National Contingency Plan (NCP). Those procedures provide for public comment periods and other procedures similar to those required to CEQA and NEPA. In addition, such actions are not subject to the requirements of CEQA or NEPA requirements to the extent the response action is conducted on-site. See CERCLA § 121(e)(1). It is anticipated that the alternatives to be evaluated will involve on-site actions. To the extent that an alternative is evaluated that falls outside of the requirements of CERCLA § 121(e)(1), the alternative's compliance with CEQA/NEPA will be identified and thoroughly evaluated as part of the FS. (also see response to # 4 below)

2. If you answered yes to #1, identify the lead governmental agency for CEQA/NEPA compliance.

   Not applicable

3. If you answered no to #1, explain why CEQA /NEPA compliance is not required for the actions in the proposal.

   Answer: CERCLA § 121(e)(1) states:

   > No Federal, State, or Local Permit shall be required for the portion of any removal or remedial action conducted entirely onsite, where such remedial action is carried out in compliance with this section.

   The SCAKR and the alternative sediment treatment and disposal facilities described within this proposal are within the designated boundaries of the IMM Superfund site. Consequently, compliance with the regulatory requirements stipulated under CEQA and/or NEPA is not required for the alternatives described in this proposal.

4. If CEQA /NEPA compliance is required, describe how the project will comply with either or both of these laws. Describe where the project is in the compliance process and the expected date of completion.

   Answer: As stated above, compliance with CEQA/NEPA is not required for this project because the SCAKR and the identified sediment treatment and disposal alternatives are within the IMM Superfund site. CEQA/NEPA compliance will be fully evaluated for actions that fall outside the scope of CERCLA section 121(e)(1). Previous Remdial Investigations (RIs) have been conducted to characterize the sediment and the project is in the preliminary phase of a FS. The expected date of completion will not be verified until finalization of the FS.

5. Will the applicant require access across public or private property that the applicant does not own to accomplish the activities in the proposal.

   Answer: No. It is expected that all project activities would be conducted on property that is owned by the Bureau of Reclamation or the United States.

6. Please indicate what permits or other approvals may be required for the activities contained in your proposal. Check all the boxes that apply.

Answer: As stated in the response to Question No. 3 (above), no Federal, State or Local permits are required for this project. However, under CERCLA § 121, Superfund cleanup actions must be protective of human health and the environment and must comply with all applicable or relevant and appropriate requirements (ARARs). [1] On-site cleanup actions must comply with the substantive[2] requirements of all ARARs, but an on-site cleanup project is exempt from the administrative requirements.

LOCAL

None Required

Other: The substantive parts of the potential Local ARARs that have been identified for the alternatives described in this proposal are found in the following Local laws and regulations:

- Federal Clean Air Act (Administered locally by the Shasta County Air Quality Management District)
- Grading/Erosion Control/Riparian Ordinances (Shasta County Planning Department)

STATE

None Required

Other: The substantive parts of the potential State ARARs that have been identified for the alternatives described in this proposal are found in the following State laws and regulations:

- California Fish and Game Code (California Department of Fish and Game, Section 1600 Streambed Alteration)
- California Fish and Game Code (California Department of Fish and Game, Sections 2081 and 2090 California Endangered Species Act)
- Porter Cologne Water Quality Control Act (California Regional Water Quality Control Board Central Valley Region Basin Plan, Fourth Edition - California Water Code)
- Section 401 Certification (California Regional Water Quality Control Board Central Valley Region)
- California Public Resources Code (State Lands Commission Land Use Lease, Sections 6303, 6321 and 6890)
- California Administrative Code Title 23 (California Department of Water Resources Division of Safety of Dams - Approval of Plans or Specifications to Construct or Enlarge a Dam or Reservoir and Certificate of Approval to Store Water and to Repair or Alter a Dam or Reservoir)

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[1] Applicable requirements are defined as "cleanup standards, standards of control and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law that specifically address a hazardous substance, pollutant, contaminant, remedial action location or other circumstance at a CERCLA site." Relevant and appropriate requirements are defined "substantive environmental protection requirements . . . promulgated under federal or state laws that, while not "applicable", . . . address problems or situations similar to those encountered at the CERCLA site that there use is well suited to the particular site." (40 CFR §300.5)

[2] Substantive requirements are those requirements that pertain directly to actions or conditions in the environment. Examples include quantitative health or risk based standards for certain hazardous substances (e.g., MCLs for drinking water), and technology based standards (e.g., RCRA minimum technology requirements for double liners and leachate collection systems). CERCLA Compliance with Other Laws Manual, EPA/540/G-89/009 OWSER Directive 9234.1-02 (August 1989).

- California Health and Safety Code Division 20 and Division 37 (California Department of Toxic Substances Control – Miscellaneous Health and Safety Provisions and Regulation of Environmental Protection)
- Title 14 and Title 27 of the California Code of Regulations (California Integrated Waste Management Board – Natural Resources and Solid Waste)
- State Historic Preservation Officer Consultation (under Section 106 of the National Historic Preservation Act)

FEDERAL

None required

Other: The substantive parts of the potential Federal ARARs that have been identified for the alternatives described in this proposal are found in the following Federal laws, regulations and authorizations:

- Executive Order 11990, Protection of Wetlands (Policy for all agencies managing federal lands)
- Clean Water Act, Section 404 (U.S. Army Corps of Engineers)
- Rivers and Harbors Act, Section 10 (U.S. Army Corps of Engineers)
- Federal Endangered Species Act, Sections 7 and 10 (U.S. Fish and Wildlife Service and National Marine Fisheries Service)
- Fish and Wildlife Coordination Act (U.S. Fish and Wildlife Service and National Marine Fisheries Service)
- National Historic Preservation Act, Section 106 (Advisory Council on Historic Preservation)
- Other Authorizations (U.S. Bureau of Reclamation – easements, right-of-ways)

Because the alternatives described in this proposal have not yet been finalized, certain ARARs listed above may not be required. Final determination of all appropriate ARARs for the alternatives selected for the FS will be provided upon completion of the FS.

Land Use Checklist

All applicants must fill out this Land Use Checklist for their proposal. Applications must contain answers to the following questions to be responsive and to be considered for funding. *Failure to answer these questions and include them with the application will result in the application being considered nonresponsive and not considered for funding.*

1. **Do the actions in the proposal involve physical changes to the land(i.e. grading, planting vegetation, or breeching levees) or restrictions in land use (i.e. conservation easement or placement of land in a wildlife refuge)?**

   _____ YES X NO

2. **If NO to # 1, explain what type of actions are involved in the proposal (i.e., research only, planning only).**

   The proposal involves the performance of a feasibility study and design.

3. **If YES to # 1, what is the proposed land use change or restriction under the proposal?**

4. **If YES to # 1, is the land currently under a Williamson Act contract?**

   _____ YES _____ NO

5. **If YES to # 1, answer the following:**

   Current land use _____
   Current zoning _____
   Current general plan designation _____

6. **If YES to #1, is the land classified as Prime Farmland, Farmland of Statewide Importance or Unique Farmland on the Department of Conservation Important Farmland Maps?**

   _____ YES _____ NO _____ DON'T KNOW

7. **If YES to # 1, how many acres of land will be subject to physical change or land use restrictions under the proposal?**
   _____

8. **If YES to # 1, is the property currently being commercially farmed or grazed?**

   _____ YES _____ NO

9. **If YES to #8, what are** **the number of employees/acre**_____
   the total number of employees _____

10. Will the applicant acquire any interest in land under the proposal (fee title or a conservation easement)?

_____ YES X NO

11. What entity/organization will hold the interest? _____

12. If YES to # 10, answer the following:

Total number of acres to be acquired under proposal	_____
Number of acres to be acquired in fee	_____
Number of acres to be subject to conservation easement	_____

13. For all proposals involving physical changes to the land or restriction in land use, describe what entity or organization will:

manage the property	N/A
provide operations and maintenance services	N/A
conduct monitoring	N/A

14. For land acquisitions (fee title or easements), will existing water rights also be acquired?

_____ YES N/A NO

15. Does the applicant propose any modifications to the water right or change in the delivery of the water?

_____ YES X NO

16. If YES to # 15, describe _____

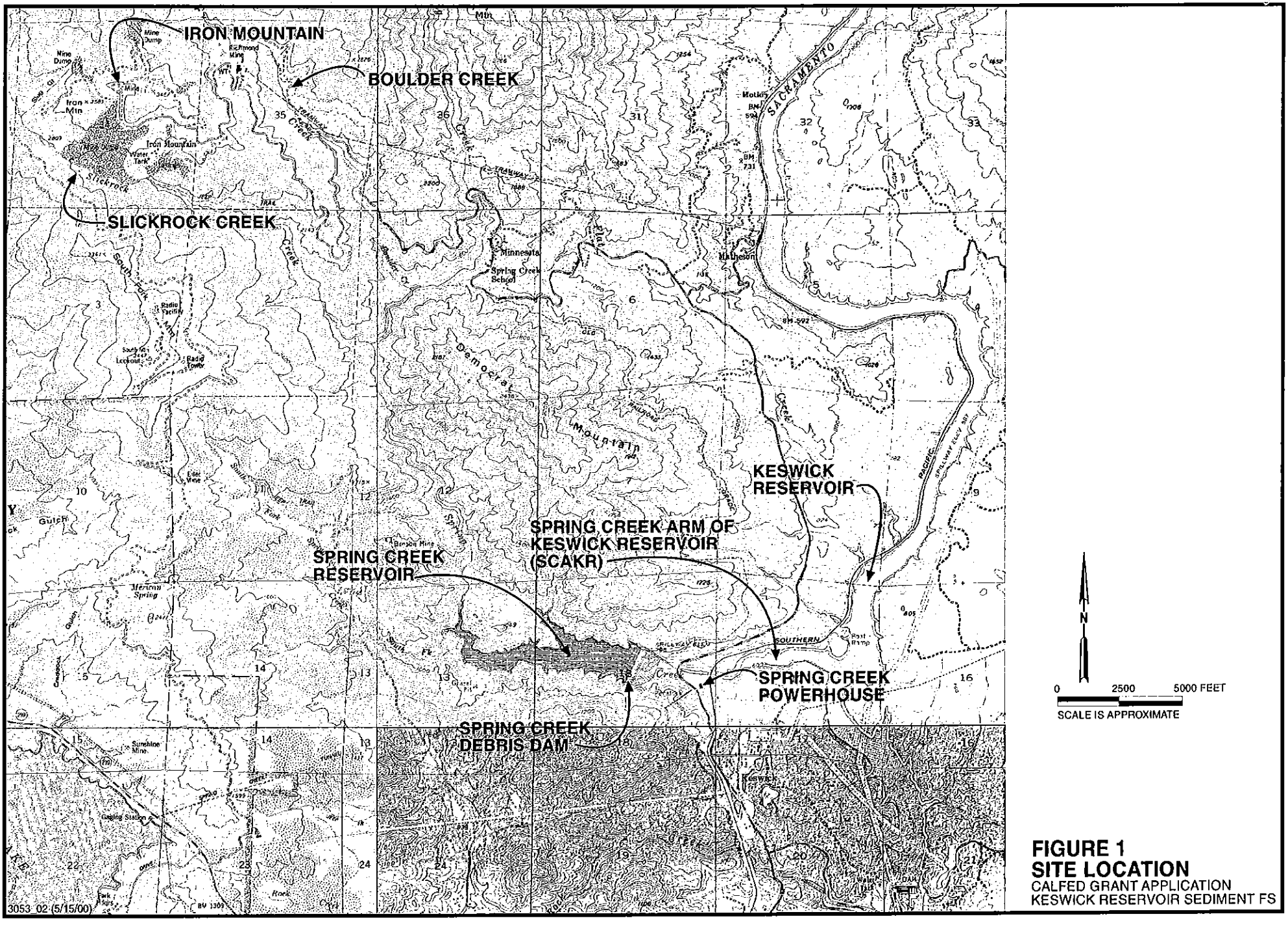

FIGURE 1
SITE LOCATION
CALFED GRANT APPLICATION
KESWICK RESERVOIR SEDIMENT FS

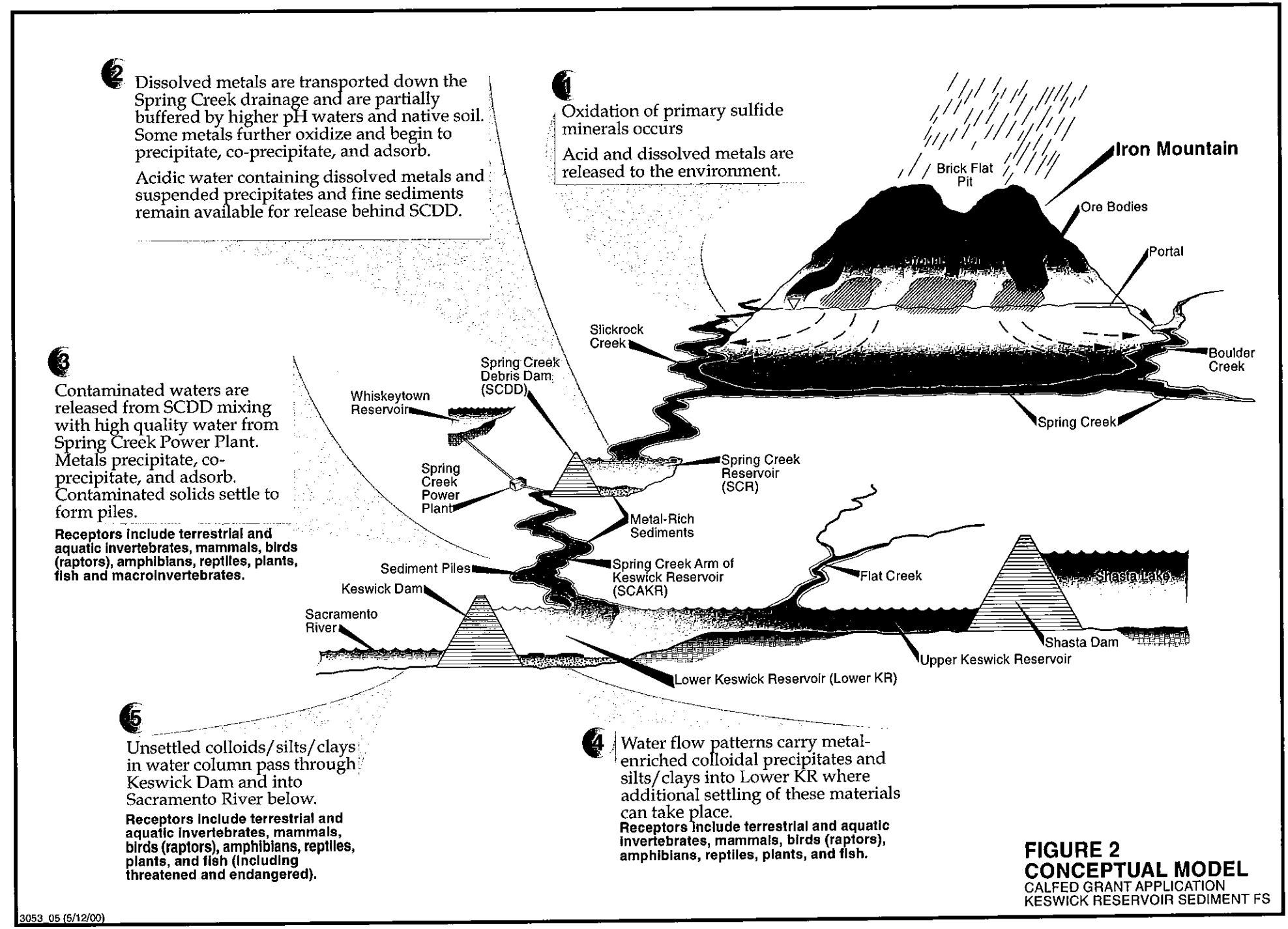

FIGURE 2
CONCEPTUAL MODEL
CALFED GRANT APPLICATION
KESWICK RESERVOIR SEDIMENT FS

3053_05 (5/12/00)

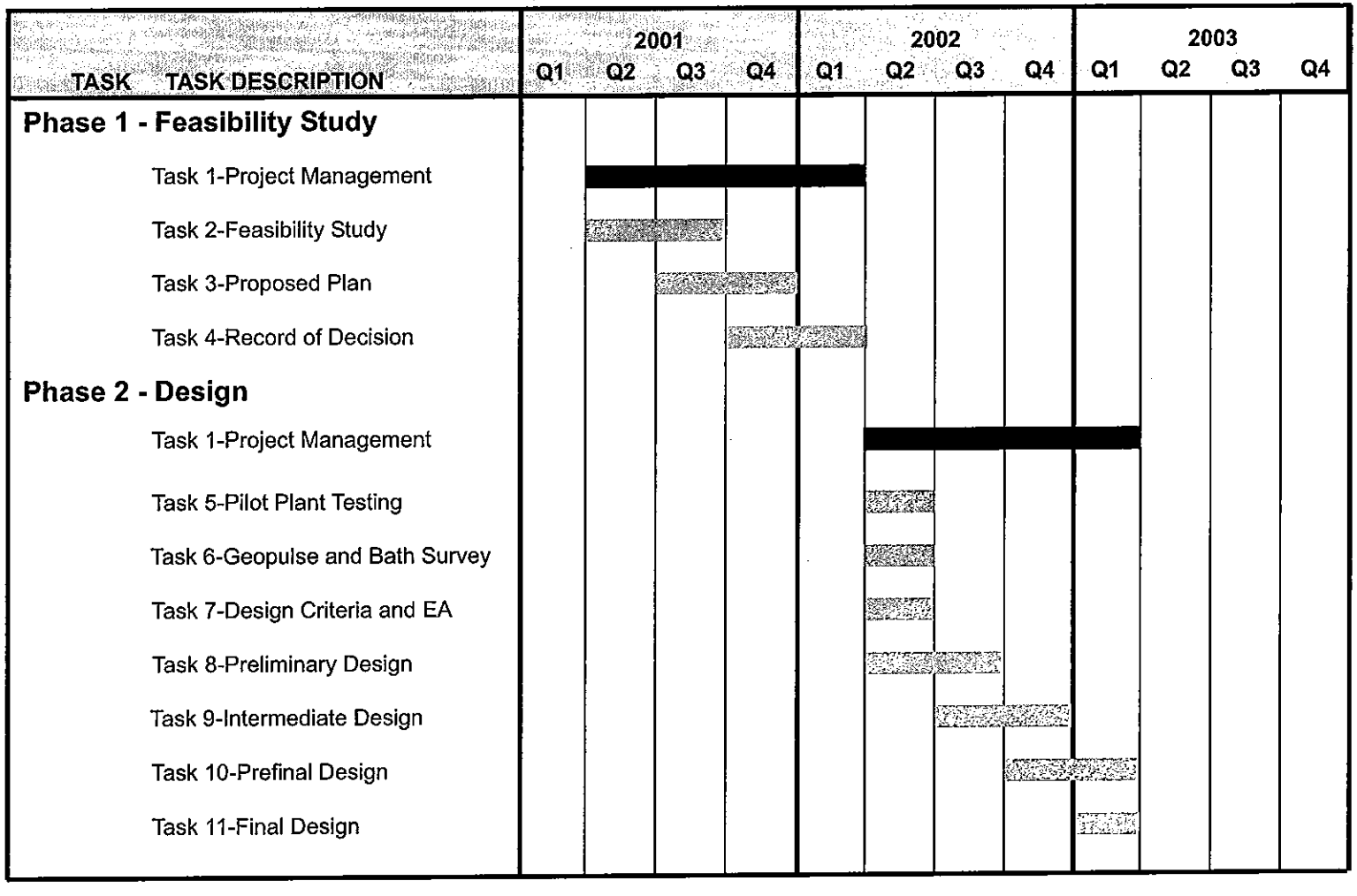

FIGURE 3
PROJECT SCHEDULE
CALFED GRANT APPLICATION
KESWICK RESERVOIR SEDIMENT FS

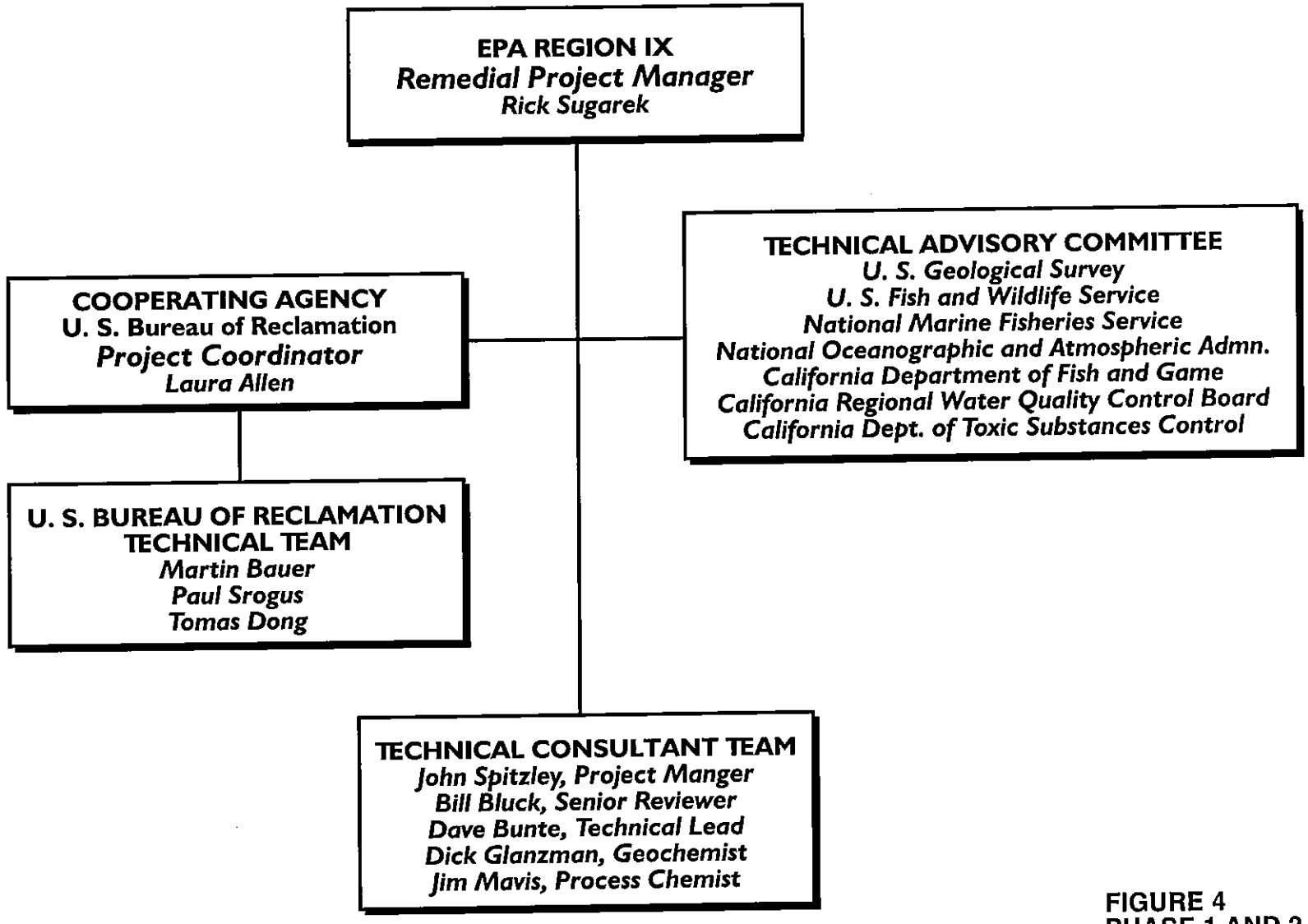

FIGURE 4
PHASE 1 AND 2
TEAM ORGANIZATION
CALFED GRANT APPLICATION
KESWICK RESERVOIR SEDIMENT FS

3053_06 (5/15/00)

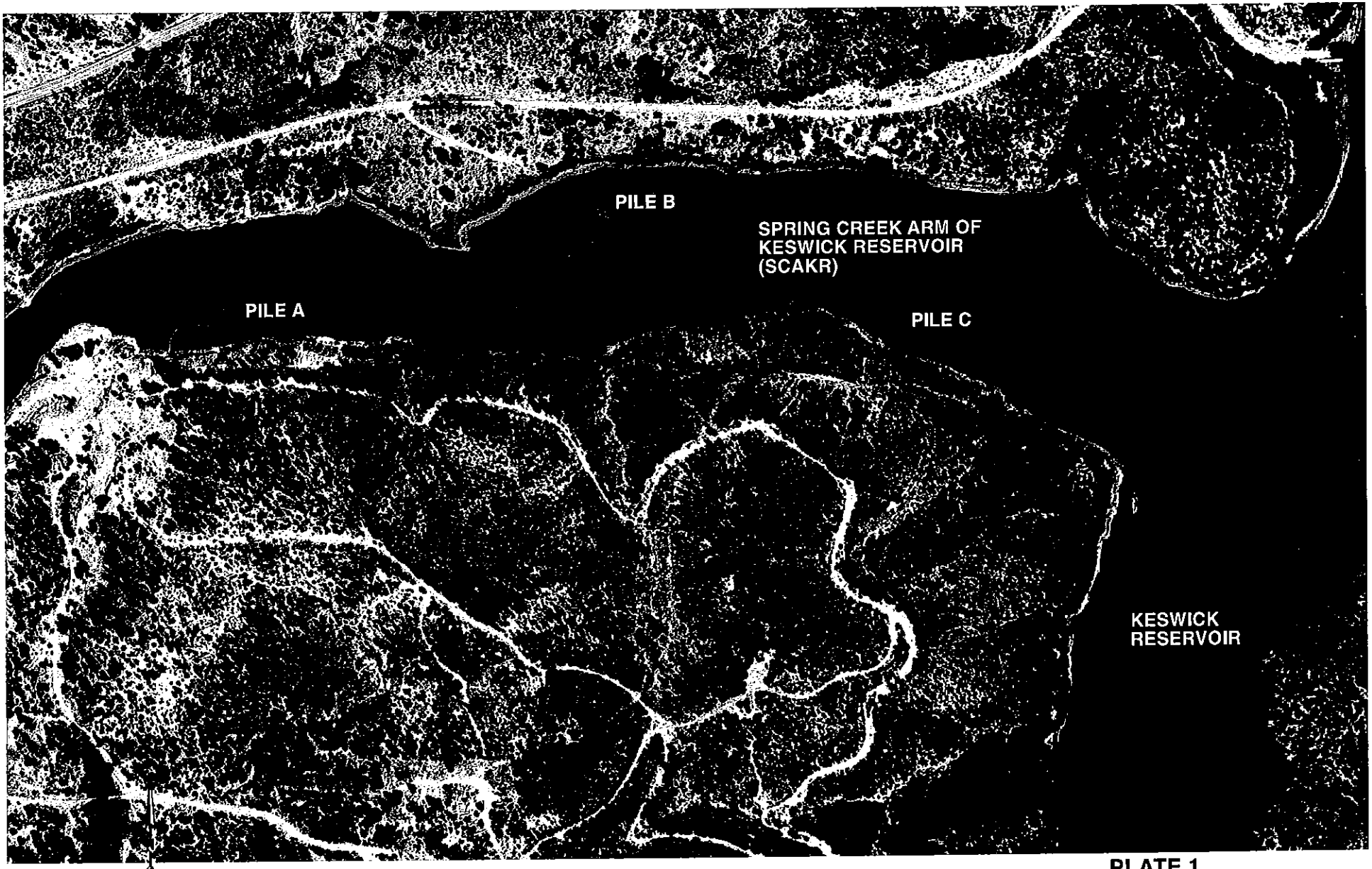

PLATE 1
AREIAL VIEW OF SPRING CREEK ARM
CALFED GRANT APPLICATION
KESWICK RESERVOIR SEDIMENT FS

3053_03 (5/15/00)